

## ABSTRACT OF THE DISCLOSURE

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A computer system employs a hierarchical ring structure  
5 for communication. Computer system elements are configured  
into modules with ring interface hardware, and the modules  
are coupled to one or more rings. Bridge modules may be  
included for transmitting between rings in the hierarchy.  
The rings are time division multiplexed, and each time slot  
10 on a ring carries a frame. According to an address carried  
within the frame, bridge modules determine whether or not to  
transmit a frame circulating on a source ring onto a target  
ring. If the address of the frame indicates a module upon  
the source ring, the bridge module retransmits the frame on  
15 the source ring. Otherwise, the bridge module transmits the  
frame on the target ring. The bridge module operates in  
this fashion at any level of the hierarchy. The owner of a  
time slot on a ring is permitted to release the time slot  
for use by other modules. To reclaim a time slot, the owner  
20 marks the time slot owned. The module using the time slot,  
upon detecting the owned mark, removes the frame from the  
time slot and responds with a null frame. If a module  
detects a frame to which that module is to respond but the  
module's buffer is full, the module may retransmit the frame  
25 upon the source ring. The time slot carrying the frame  
effectively serves as a queue position. According to one  
embodiment, rings comprise optical links.

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